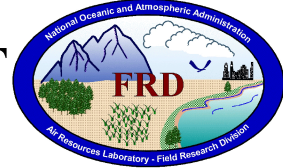# FRD ACTIVITIES REPORT
December 2005

Research Programs

Urban Dispersion Program (New York City)

Manual measurements and photographs were made of the FRD instrument locations during the Urban Dispersion study in New York City because of the unreliability of the GPS due to the tall buildings throughout Midtown Manhattan. Part of December was spent working with PNNL in mapping out these manual measurements of the release, sampler and van locations within a meter of their actual position in a GIS database. After several iterations, we have some final coordinates that will be merged with the final data files. The final data files should be ready for submission to the archive within a few weeks.

Locations for the mobile van at specific times were determined from careful inspection of operator notes and comparison with the data. Where good locations could be determined, they were inserted in the data files. The few good GPS readings were also left in the data file. All other points were marked as location unknown.

We have communicated with the archive manager about the format of the data, but have received no response yet. The data is currently in the same format as the Joint Urban 2003 data. (Roger Carter, 208-526-2745, Jason Rich)

After the deployment to New York City, several of the continuous SF_6 analyzers required some maintenance. We have been operating these and repairing the problems this month. We have also been taking the opportunity to check a number of the subsystems used on the continuous analyzers and do some further testing on the response of the analyzers to perfluorocarbon tracers. (Roger Carter, 208-526-2745, Debbie Lacroix)

ET Probe

The final text additions and figures required to complete the manuscript "A Pressure-Sphere Anemometer for Measuring Turbulence and Fluxes in Hurricanes" were received just before the holidays in December. These additions will be merged into the manuscript in January, and then it will be queued into the review process. The manuscript is intended for submission to the *Journal of Atmospheric and Oceanic Technology*. (Richard Eckman, 208-526-2740, Ron Dobosy, ATDD)

Smart Balloon

All of the smart balloon instruments have been rearranged and mounted to a lightweight, rigid circuit board for insertion into a new 8-inch fiberglass enclosure. The new arrangement of

instruments should not only allow everything to fit inside the fiberglass enclosure, but it should make the balloon preparation and troubleshooting easier during field deployments. (Randy Johnson, 208-526-2129, and Shane Beard)

Cooperative Research with DOE NE-ID (Idaho National Laboratory)

Mesoscale Modeling

For several years the mesoscale modeling community has been developing a next-generation weather prediction system called the Weather Research and Forecasting (WRF) model. During much of this time the system did not have the functionality to be a suitable replacement for current systems such as MM5, but this is now changing. The latest versions of WRF contain the features required for applied research such as that conducted at FRD. In December WRF version 2 was downloaded at FRD to investigate its possible use as a replacement for the current MM5 forecast model. Two test cases were successfully run on a Linux system. What stood out most from the test cases was the enormous compile times required for the model. Just one of the modules in the code required over two hours to compile, using nearly 1 GB of memory in the process. However, this might partly be the fault of the FORTRAN compiler rather than the code itself. Further tests of WRF are planned over the next few months. One problem with using WRF at FRD is that currently there does not appear to be a converter that allows HYSPLIT to be driven by WRF output. (Richard Eckman, 208-526-2740)

Transport and Dispersion Modeling

On 15 December a demonstration of the HYSPLIT dispersion model was given to interested parties from DOE, the INL contractors, and the State of Idaho. For the demonstration, HYSPLIT was driven by output from the MM5 mesoscale model currently running at FRD on 12 and 4 km grids. FRD is advocating HYSPLIT as a replacement for the current dispersion modeling based on the MDIFF puff model. HYSPLIT provides a more realistic representation of dispersion in a complex environment while still being being fast enough to provide output in a timely manner. Moreover, it is widely supported within NOAA, so its adoption at FRD would be beneficial both to INL and to NOAA. (Richard Eckman, 208-526-2740)

Other Activities

Papers

Hicks, B., K. Clawson, W. Pendergrass, and R. Eckman, 2005: Applying local data to urban dispersion forecasting. *EM Magazine*, Dec. 2005, 26-30.

Businger, S., R. Johnson, R. Talbot, 2005: Scientific Insights from Four Generations of Lagrangian Balloons in Atmospheric Research. *Bulletin of the American Meteorology Society.* Submitted to BAM.

Safety

The NOAA safety video "Winter Safety" was shown at the monthly staff meeting. (Debbie Lacroix, 208-526-9997)

Personnel

The certificates of eligibility for the vacant Meteorologists, ZPIII, position, were received. Telephone interviews were held this month, and face-to-face interviews will be held in January.